Claims 16, 17, 18, 19, 20 and 21, line 2, change "up to about 360" to

--350 to 370--.

23. (Amended) The activated alumina catalyst as defined by Claim 1, comprising

beads having pore volume of alumina of pores of diameter greater than 0.1 [Nm] μm of

18.5 ml/100g and pore volume of pores of alumina of diameter greater than 1 [Nm] μm of

15.5 ml/100g. `

REMARKS

Reexamination and reconsideration of the application identified in caption, as

amended, pursuant to and consistent with 37 C.F.R. § 1.112, and in light of the remarks

which follow, are respectfully requested.

The various issues raised in the November 2, 1998 Official Action are discussed in

the order in which they appear in the Official Action.

The §112, ¶1 Rejection

Claims 16-21 were rejected under 35 U.S.C. §112, first paragraph, for the reasons

set forth on page 2 of the Official Action. In the Official Action it is alleged that the

specification "does not reasonably provide enablement for a specific surface area which is

lower than 350 m^2/g" and that the specification is enabling for a specific surface in the

range of 350 to 370 m^2/g (Official Action at page 2). However, the specific surface

referred to in the Official Action relates to that of alumina in Example 2 of the

specification. Other portions of the specification disclose that the catalyst can include

materials other than alumina in amounts up to 40% (see specification at page 4, line 18

through page 5, line 6). Although Applicants do not acquiesce in the rejection, Claims 16-21 have been amended to recite the 350 to 370 m²/g range.

The §112, ¶2 Rejection

Claims 1-23 stand rejected under 35 U.S.C. §112, second paragraph for the reasons set forth on page 3 of the Official Action. Although the rejection is respectfully traversed on the basis that it is clear from the specification what is meant by "cocatalytically effective amount" and/or the specific recitation of a range for the "effective amount", a clarifying amendment has been made to Claim 1 which now recites that the amount is effective for conversion of CS_2. Further, Claim 23 has been amended to correct a typographical error, i.e., change "Nm" to --μm--. Accordingly, withdrawal of this ground of rejection is respectfully requested.

The §103 Rejection

Claims 1-21 were rejected under 35 U.S.C. §103 as allegedly being unpatentable over Goodboy in view of U.S. Patent No. 5,244,648 ("Dupin") or U.S. Patent No. 3,856,708 ("Carithers"). This rejection is respectfully traversed for the following reasons.

Legal Standard For Overcoming §103 Rejections

In In re Baird, 29 USPQ 2d 1550 (Fed. Cir. 1994), the court stated that "[t]he fact that a claimed compound may be encompassed by a disclosed generic formula does not by itself render that compound obvious." Also, evidence of unexpectedly good results can overcome a rejection based on optimization of a "result effective variable" provided the

unexpected results are established by factual evidence. In re DeBlauwe, 222 USPQ 191, at

196 (Fed. Cir. 1994). With respect to optimization, in In re Antonie, 195 USPQ 6, 8

(CCPA 1977), the court stated that:

> The PTO and the minority appear to argue that it will always
> be obvious for one of ordinary skill in the art to try varying
> every parameter of a system in order to optimize the
> effectiveness of the system even if there is no evidence in the
> record that the prior art recognized that particular parameter
> effected the result. As we have said many times, obvious to
> try is not the standard of 35 U.S.C. §103. (Emphasis in
> original.) Antonie, at 8.

The court in Antonie also stated that while the discovery of an optimum of a

variable in a known process is normally obvious, there are two exceptions to the rule. The

first exception is when the results of optimizing a variable, which was known to be result

effective, were unexpectedly good. The second exception is in the case where the

parameter optimized was not recognized to be a result-effective variable. In the present

case, while Goodboy provides no recognition that low Na_2O contents would be effective in

providing improved CS_2 conversion rates, the Nedez Declaration submitted with the

Amendment filed May 28, 1998 shows that the claimed Na_2O range produces unexpected

improvement in CS_2 conversion in comparison to the closest examples (interpolated using

Attachment I of the Nedez Declaration) of Goodboy.

Goodboy states that increased sulfur conversion can be obtained using an activated

alumina catalyst in which sodium oxide concentration, LOI (hydroxyl content determined

by heating from 400° to 1100°C) and surface area are controlled (column 3, lines 17-21

and 31-32 of Goodboy). Goodboy discloses a broad range of 0.1 to 2.5 wt % sodium oxide but prefers 0.50 to 2.5 wt % on a 1000°C calcined basis (column 3, lines 57-60 of Goodboy). Goodboy teaches away from low sodium oxide contents at column 4, lines 18-35 wherein it is stated "low sodium oxide content was believed to be desirable...[but contrary] to this expectation, significant amounts of sodium oxide are not only tolerable to a Claus catalyst, but , in fact, are beneficial . . ."

Goodboy's Examples 1-9 show a conversion rate of "S" of 79.1 to 82.9% for Na_2O contents of 0.44, 1.36, 0.43, 0.41, 0.09, 2.10, 0.10 and 0.33 wt % (1000°C Basis) according to Table I of Goodboy. Such results would be plotted as an essentially flat curve, the conversion rate of 0.09 and 0.10 wt % Na_2O being essentially the same as that of the 0.33 wt % and above Na_2O contents. Further, it is noted that Goodboy measured SO_2 chemisorption rather than conversion of CS_2.

It is well established that the unexpected discovery of improved results for a limited range within a broader range merits patent protection. See Baird, supra. In view of Goodboy's preference for Na_2O contents in amounts of 0.5% and above and Goodboy's data showing essentially the same conversion rate for Na_2O contents of 0.09 to 2.10%, the skilled artisan would not have expected low Na_2O contents to produce the dramatic improvement in CS_2 conversion discovered by Applicants. It is submitted that Applicants' showing of unexpected improvement in CS_2 conversion rates for the claimed range of 0.12 to 0.25% Na_2O rebuts any prima facie case of obviousness based on Goodboy.

The Nedez Declaration includes Attachment I wherein CS_2 conversion is plotted with respect to various Na_2O contents in a gas-catalyst prepared according to the process set forth in paragraph 2 of the Nedez Declaration. Attachment I shows the interpolated data corresponding CS_2 conversion rate for the closest Na_2O examples of Goodboy compared to the claimed 1,200 to 2,500 ppm Na_2O range (see paragraph 7 of the Nedez Declaration). Attachment I shows that the claimed 1,200 to 2,500 ppm Na_2O content provides new and unexpected results with respect to CS_2 conversion compared to Na_2O contents above and below the claimed range.
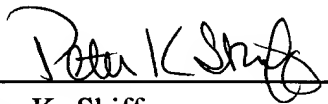
In the Official Action, it is stated that Goodboy discloses "improved Claus catalyst made from activated alumina and sodium oxide . . . the catalyst possesses . . . higher catalytic activity with respect to compounds such as . . . CS_2 . . ." (Official Action at page 8). Further, while it is acknowledged that "a catalyst is unpredictable" it is argued in the Official Action that "sodium oxide is a recognized result-effective parameter" (Official Action at page 8). Finally, the Official Action argues that a skilled artisan "would reasonably expect that within the . . . sodium oxide concentration taught by Goodboy an optimum concentration for catalytic activity with respect to CS_2, H_2S, SO_2 and COS would differ for each" (Official Action at page 9). However, in view of Goodboy's Examples 1-9 wherein SO_2 conversion is essentially the same (79.1 to 82.9%) for all Na_2O contents in the range of 0.09 to 2.10 wt % Na_2O, it is submitted that one of ordinary skill in the art would not have expected to find an "optimum" concentration of Na_2O based on the teachings of Goodboy. Besides, whether or not the effect of Na_2O is a recognized result effective

variable, unexpectedly improved results for a recognized result effect variable can overcome a prima facie case of obviousness. See <u>Antonie</u>, supra.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: _____

Peter K. Skiff
Registration No. 31,917

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

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